SUBJECT INDEX

A

Acetobacter xylinum
  microfibril formation in, 176
Achyla
  cell wall expansion in, 183
Acid chain hypothesis
  mitochondrial preprotein import and, 44
Acrobeloides bodenheimeri
  dextral/sinistral subpopulations of, 61
Actin
  nucleus and, 688
Actin cytoskeleton
  cadherin-based cell adhesion and, 128–29
  cell adhesion and, 159–63
  cytoplasm transport and, 150–54
  in *Drosophila* ovary, 147–66
  interaction with microtubules, 154–55
  oocyte patterning and, 154–56
  pollen tube growth and, 715–18
  regulation of, 156–58
Actin filaments, 84
  zonula adherens junctions and, 136–37
Actin microfilaments
  interactions with plasma membrane, 705
Activin
  C-cadherin-based adhesion and, 131
  meso-endoderm formation and, 614
  meso-endoderm induction and, 621–22
Acylation-stimulating protein (ASP)
  adipocyte differentiation and, 238–39
Adherens junctions
  cadherin-based, 119–41
    assembly and physiological function of, 135–37
Adipocyte(s)
  energy homeostasis and, 232
  fully differentiated
    control of *obese* gene in, 250–51
Adipocyte determination and differentiation-dependent factor 1 (ADD1), 245–46
Adipocyte differentiation, 231–52
  endocrine factors and, 236–38
  models of, 233–36
  paracrine factors and, 238–40
  transcription factors and, 240–47
Adipogenesis
  transcription factors and, 246–47
Adipose tissue
  ADD1/SREBP1 expressed in, 245–46
  endocrine/paracrine signals and, 231
Algae
  cellulose microfibrils of, 175
Amniotes
  organizer in, 614
Amphibia
  blastopore of
    organizer in, 613
Amphibian development
  blastula stage of
    Spemann organizer and, 612
  dorsal-ventral patterning and, 624–30
  early
    events of, 615
  without gastrula organizer, 638–39
  gastrula organizer in, 634–38
    functions of, 639–45
  late blastula/early gastrula in
    dynamic marginal zone of, 632–33
  meso-endoderm induction and, 614–24
  signaling proteins and, 630–32
Amphibian embryo patterning
  signal transduction pathways and, 616
Amphibian extracts
  nuclear assembly in, 674
Amygdala kindling, 577
Anaphase-promoting complex (APC), 274
Angiotensinogen
  adipocyte differentiation and, 239
Anillin, 163
Animal body plans
  axes and asymmetries in, 54–55
Animal cells
  morphogenesis in, 701–3
Animal development
  left-right asymmetry in, 53–78
Antibiotics
  beta-lactam
    penicillin-binding proteins and, 405
Antibodies
  perturbation of L1 function with, 432
Antigen-MHC complex
  CD4/CD8 and, 523
Antioxidants
  epidermal growth factor receptor and, 556
Antiviral factor receptors, 546
Apoptosis
  Src kinases and, 570–71
Arabidopsis
  blue light-mediated phototropism in, 207–8
  expansin cDNA in, 190
  intracellular signaling pathways in, 458
  light responses in, 205–6
  photomorphogenesis mutants in, 218–19
  phytochrome apoprotein mutants in, 214
Arabidopsis thaliana
  cell plate formation in, 730
  gnom mutations in, 732–33
  root hair development in, 720–21
  root meristem of
    asymmetric division in, 731–32
Arabidopsis thaliana chloroplast
  GTP-binding loop in, 402
Arabidopsis thaliana trichome
  formation of
    mutations and, 712
Arabinogalactan glycoproteins
  pollen tube growth and, 713–14
Arabinogalactan proteins (AGPs)
  in plant tissues, 180
Arabinoxylan
  of maize coleoptiles, 192
Arabinoxylans
  binding to cellulose, 177
Archaea
  GTP-binding loop in, 402
Ascaris megalocephala
  handed asymmetry in, 60
Aspartate
  binding to receptors, 473

Aspartate kinase
intracellular signaling in prokaryotes and, 458
Aspartate receptor, 471
aspartate-binding site of, 474
periplasmic sensory domain of, 472
Aspartate receptor-kinase complex
disulfide bonds in, 480
Asymmetry
See Left-right asymmetry
ATP
MukB protein and, 413
origin recognition complex and, 296–97
Autolysins
bacterial cell division and, 412
Autoneuralization, 650–51
Auxin
photomorphogenesis and, 223
plant cell wall polysaccharide biosynthesis and, 184
Axis-stabilizing complex (ASC), 706
Axon(s)
commissural
netrins and, 446–47
Axonal growth
fibroblast growth factor receptor and, 427, 441–44
growth cone and, 426–27
Ig CAMs and, 430–35
L1 and, 433–34
myelin-associated glycoprotein and, 447–49
neural cell adhesion molecules and, 435–37
non-receptor tyrosine kinases and, 440–41
receptor phosphatases and, 427, 444–46
soluble CAM-Fc chimeras stimulating, 439
tyrosine phosphorylation and, 444–46
Axonemes
microtubule nucleation from, 85–86
Axonin-1
NgCAM and, 434–35

B

Bacillus
FtsQ homologues in, 409
Bacillus subtilis
cell division in
cell shape and, 412
cell division site in, 721–22
spore differentiation in, 699–700
spore formation by
FtsZ and, 415
Spo0J protein and, 414
sporulation protein of
FtsW and, 411
Bacteria
chemosensory pathway of, 460–67
distribution of components of, 466
domain organization of, 463
receptor-kinase signaling complex in, 469–94
See also Gram-negative bacteria; Gram-positive bacteria
Bacterial cell division, 395–417
cell cycle and, 415–17
molecular machine for, 397–404
septal peptidoglycan synthesis and, 404–12
spatial regulation of, 412–15
Bacterial chemotaxis, 457–504
chemosensory pathway and, 460–67
motor rotational switch and, 502–3
receptor-kinase signaling complex and, 469–94
response regulators and, 494–502
soluble receptors and, 467–69
Bacterial SOS response, 417
Bafilomycin
vacuolar (H^+)-ATPase and, 781, 793
BAPTA
nuclear pore assembly and, 682
nuclear vesicle fusion and, 679–80
Bass, R. B., 457–504
Batten's disease, 793
B cell receptor (BCR), 522
components of, 523
Bean leaves
maturation of
growth cessation during, 192
Bell, S. P., 293–327
Beta-lactam antibiotics
penicillin-binding proteins and, 405
Bilateral symmetry
in *Drosophila*, 62–64
imposition of, 62
vs. left-right asymmetry, 56, 78
Biliverdin reductase
phytochromobilin and, 214
Blastomeres
embryonic
cadherin-based adhesion in, 135–36
Blastula
late
dynamic marginal zone of, 632–33
Blue light
plant responses to, 206–9
Blue light-mediated phototropism, 207–8
Blue light receptors, 208–9
Bombesin
Src kinases and, 544
Bone remodeling
Src disruption and, 573–74
Bone resorption
V-ATPases and, 780, 783–84
Border cells, 149
Bradykinin
Src kinases and, 544
Bradynema rigidum
handed asymmetry in, 61
Brain
mammalian
neurons in, 426
Bramhill, D., 395–417
Brassica
phytochrome apoprotein mutants in, 214
self-incompatibility recognition in, 713
Brassinolide, 222–23
Brieher, W. M., 119–41
Bronchial cilia
Kartagener's syndrome and, 65
Brown algal zygotes
morphogenesis in, 703–10
Brugge, J. S., 513–84
Butler, S. L., 457–504

C

CAAT/enhancer-binding protein (C/EBP)
adipocyte differentiation and, 240–43
Cadherin(s)
adhesive function of
regulation of, 131–35
cell adhesion and, 381–83
signal transduction and, 137–40
Src kinases and, 535
Cadherin adhesion molecule, 120
Cadherin-based adherens junctions, 119–41
assembly and physiological function of, 135–37
Cadherin-based cell adhesion
actin cytoskeleton and, 128–29

molecular mechanisms of, 121–131
Cadherin-catenin complex, 123
fodrin cytoskeleton and, 137
plakoglobin and, 128
receptor tyrosine phosphatases and, 133
Cadherin cytoplasmic tail
adhesive contributions of, 126–28
Cadherin domains
cell adhesion and, 372
Cadherin ectodomain
specific adhesive binding and, 122–26
Caenorhabditis elegans
chemosensory transduction in kinesin motor protein and, 746
germline mitosis in induction of, 339–42
gld-1 protein of, 569
handed asymmetry in, 58–61
LIN-12/GLP-1 receptors of, 334–35
netrin homologues in, 447
signal transduction pathways in second site suppressors and, 217
Caenorhabditis elegans embryo
blastomere specification in, 342–43
P1 cell of
cell division in, 701–2
Caenorhabditis elegans gonad
AC/VU decision in, 343
Calcium
nuclear vesicle fusion and, 679–80
pollen tube growth and, 715–18
Calcium channels
Src kinases and, 551–53
Calmodulin kinase inhibitor
axonal growth inhibition and, 441
Cambium
hydroxyproline-rich glycoproteins and, 179
cAMP
adipocyte differentiation and, 236
Cancer
cadherin complement and, 134
DCC gene and, 446
Carlson, M., 1–19
Catenin(s)
cell adhesion and, 126–28
β-Catenin mRNA
amphibian development and, 628–29
Caudalization, 653–56
Caulobacter crescentus
cell cycle of
control points in, 415
FtsZ division protein in, 416
predivisional cell of
flagellar assembly in, 700
Caveolae
Src kinases in, 516
Caveolin
Src kinases and, 534
CD2
cell adhesion and, 374–76
immunoglobulin-like domain of, 367
CD4
antigen-MHC complex and, 523
immunoglobulin-like domain of, 367
Lck activation and, 524
CD8
antigen-MHC complex and, 523
Lck activation and, 524
CD14
Src kinases and, 549
CD45
Src kinases and, 525
CDC5
eukaryotic DNA replication and, 313
CDC6
eukaryotic DNA replication and, 302–6
CDC7
eukaryotic DNA replication and, 311–12
CDC14
eukaryotic DNA replication and, 313
CDC45
eukaryotic DNA replication and, 313–14
Cell adhesion, 363–89
actin cytoskeleton and, 159–63
atomic-resolution structures for implications of, 374–86
β-sandwich domains and, 367–74
cadherin-based
actin cytoskeleton and, 128–29
molecular mechanisms of, 121–131
cadherin domains and, 372, 381–83
CD2 and, 374–76
effector mechanisms modulating, 134–35
fibronectin domains and, 371–72
fibronectin-III domains and, 378–81
immunoglobulin domains and, 367–71
integrin-based, 131
integrin I domains and, 383–86
peripheral myelin protein zero and, 376–78
Src kinases and, 560
VCAM domains and, 376
Cell adhesion molecules (CAMs), 425–50
lateral clustering of, 129–31
second messenger cascades and, 439–40
signaling properties of, 438–46
Src kinases and, 534
See also Immunoglobulin cell adhesion molecules
Cell adhesion receptors
Src kinases and, 529–36
Cell-cell interactions
LIN-12/Notch signaling pathway and, 339–44
Cell culture models
adipocyte differentiation and, 233–35
Cell cycle
bacterial cell division and, 415–17
cyclin-dependent kinases and, 262–66
microtubule dynamics and, 103
protein degradation and, 322
Cell cycle progression
Src kinases and, 565–70
Cell differentiation
Src kinases and, 571–72
Cell division
bacterial, 395–417
cell cycle and, 415–17
molecular machine for, 397–404
septal peptidoglycan synthesis and, 404–12
spatial regulation of, 412–15
microtubules and, 84
in plants
spatial regulation of, 721–33
Cell migration
Src kinases and, 564–65
Cellular taxis
regulation of, 460
Cellulose
in plant cell walls, 175–76
Central nervous system
synaptic junctions in, 120
Centrioles
initial handedness choice and, 74–76
Centrosomes
initial handedness choice and, 74–76

microtubule nucleation from, 85–86
Cephalochordates
blastopore of
organizer in, 613
Ceratodon purpureus
tip growth in, 710–11
Chalcone synthase gene
CRY1 regulating, 208
Channels
Src kinases and, 551
Chaperones
cytosolic
preprotein targeting to mitochondria and, 28
molecular
mitochondrial protein import and, 26–28, 41
Chaperonins
cell division in *E. coli* and, 403
protein folding in mitochondrial matrix and, 41
CheA histidine kinase, 489–94
catalytic domain of, 493–94
P1 phosphotransfer domain of, 490–92
P2 response-regulator docking domain of, 492–93
receptor docking region of, 494
CheB
aspartate kinase domain of, 494–99
output domain of, 500
Chemosensory pathway, 460–67
components of
distribution of, 466
domain organization of, 463
Chemosensory transduction
bacterial, 457–504
kinesin motor protein and, 746
Chemotaxis
See Bacterial chemotaxis
Chemotaxis proteins
properties of, 462
CheR methyltransferase
receptor cytoplasmic domain and, 486–87
Chervitz, S. A., 457–504
CheW protein
receptor cytoplasmic domain and, 489
CheY
aspartate kinase domain of, 494–99
CheZ phosphatase, 500–2
Chick
DSL homologues in, 351
Chick embryo
left-right asymmetry in, 67
Chirality
initial handedness choice and, 74
Chlamydomonas
noncellulosic cell wall in
major structural protein of, 179
Chlorpromazine
neurotransmitter uptake and, 784
Cholinergic receptor agonists
cadherin-based cell adhesion and, 131
Chordates
organizer in, 613
Chory, J., 203–25
Chromaffin granules
V-ATPases and, 780, 784
Chromatin
gene expression and, 3
nuclear, 671
nuclear matrix structure and, 688
nuclear pore complex assembly and, 684
nuclear vesicle targeting to, 675–79
targeting nuclear membranes to, 669
transcriptional repression and, 14–16
Chromodomain protein, 669
Chromokinesin, 767
Chromoproteins, 204
Chromosome(s)
nuclear envelope and, 670
Chromosome segregation
bacterial cell division and, 413–14
microtubules and, 746
Cilia
microtubules and, 84
Circadian rhythms
light signaling and, 223
Clathrin-coated vesicles
V-ATPases in, 780
CLS proteins, 337
Collapsins
axonal growth and guidance and, 427
Contactin
Src kinases and, 549–50
Cooley, L., 147–66
Cortactin
phosphorylation of, 563
Cortical cytoskeleton
cell division and, 721–27
Cosgrove, D. J., 171–94
Craig, E. A., 25–46
CRY1 blue-light receptor, 206–7
chalcone synthase gene and, 208
Cryoelectron microscopy
microtubule polymerization and, 97–99
Cryptochromes, 204–5
blue light and, 206–7
signal transduction and, 217–24
CSL proteins
regulation of, 338–39
Cucumber
expansin cDNA in, 189
Cucumber hypocotyls
acid-induced cell wall extension in, 192
Cyanobacteria
chromatic adaptation in
sensor for, 212
higher plant phytochromes and, 212
Cyclin
cyclin-dependent kinases and, 263–64
initiation of DNA replication and, 320
regulation of, 273–75
structure of, 267–69
Cyclin binding
cyclin-dependent kinase activation and, 269–73
Cyclin-dependent kinases (Cdks), 261–86
activation of
cyclin binding and, 269–73
phosphorylation and, 275–78
catalytic subunit of
structure of, 267
cell cycle and, 262–66
cyclin subunit of
structure of, 267–69
inhibition of
phosphorylation and, 280–82
inhibitory subunits of, 278–80
initiation of DNA replication and, 320
regulators of, 282–83
regulatory mechanisms for, 266–83
Cyclophilin 20, 41
Cyclosome, 274
Cyclosporin A
peptidyl-prolyl *cis/trans* isomerase and, 41
Cyclostomes
blastopore of
organizer in, 613
Cytokine receptors
Src kinases and, 546–48
Cytokinesis
phragmoplast and, 727–30
Cytokinins
photomorphogenesis and, 223

Cytoplasmic mRNA
localization of
microtubules and, 746
Cytoplasmic pH
V-ATPases and, 780
Cytoskeleton, 84
Cytosolic chaperones
preprotein targeting to
mitochondria and, 28

D

Danielson, M. A., 457–504
DBF4 protein kinase
eukaryotic DNA replication
and, 311–12
DCC gene
cancer and, 446
De-etiolation
mutants affecting, 222
phytochromes and, 209
Dephosphorylation
Src kinases and, 525
Desai, A., 83–111
Desmosomes, 120
plakoglobin and, 128
Dexamethasone
adipocyte differentiation and,
239
Diacylglycerol lipase inhibitor
axonal growth inhibition and,
441
Diaminopimelic acid, 404
Dicotyledons
primary wall of
xyloglucan in, 176
Dictyostelium
intracellular signaling pathways
in, 458
Dictyostelium discoideum
phagosomal acidification in,
785
Dihydropyridine receptor
polar growth and, 705–6
DNA
MukB protein and, 413
DNA binding
origin recognition complex and,
296
DNA replication
nuclear envelope and, 670
See also Eukaryotic DNA
replication
DNA replication state, 323–24
DNA synthesis
induction of
Src kinases and, 565–66
PI 3-K isozyme and, 567–68
DNA transcription
nuclear envelope and, 670
Doherty, P., 425–50
Dorsalization, 642–43
Dorsal-ventral patterning,
624–30
signal transduction pathways
and, 614
Drosophila
armadillo locus in, 159–62
bilateral symmetry in, 62–64
hedgehog signaling pathway in
protein kinase A and, 162–63
KLP61F kinesin motor of, 761
netrin homologues in, 447
Notch receptor of, 334–35
rho family of proteins in,
156–58
sensory bristles in
development of, 343
sensory organs in
development of, 348–49
signal transduction pathways in
kinesin motor protein and,
746
second site suppressors and,
217
SOG/DPP interaction in, 653
Src kinases of, 580–82
wing margin in
induction and regulation of,
343, 348
Drosophila embryo
adherens junction formation in
β-catenin and, 127
cell-free nuclear assembly and,
672
zonula adherens assembly in
gene mutations perturbing,
136
Drosophila melanogaster
actin cytoskeleton in
regulation of, 718
asymmetric cell division in, 731
MCM proteins of, 309–310
neuroblasts of
asymmetric division in,
702–3
origin recognition complex of,
301–2
Drosophila oocyte
cytoplasm transport in, 150–54
TGF-β and, 158–59
localization of posterior
determinants in
tropomyosin II and, 155–56
Drosophila oocyte patterning
actin cytoskeleton in, 154–56
Drosophila oogenesis, 148–50
ring canals and, 163–66
Drosophila ovary
actin cytoskeleton in, 147–66
DSL transmembrane proteins
LIN-12/Notch receptors and,
336
receptor activity and, 337–38
Dutta, A., 293–327
Dynamic instability, 84, 88–89
microtubule, 90
functions of, 100–2
minus-end, 91
observation in vitro, 89–91
structural basis of, 97–99
thermodynamic basis of,
91–94
Dynein, 746

E

Ectoderm
neural induction of, 643–45
Electron microscopy
tubulin polymerization and, 97
Embryo(s)
invertebrate
handedness in, 56–64
left-right asymmetry in, 55
mammalian
handedness in, 77
vertebrate
control of handedness in,
64–73
left-right asymmetry in, 55
Embryonic handedness
control of, 56
Emerin, 669
Emery-Dreifuss muscular
dystrophy and, 677
Emery-Dreifuss muscular
dystrophy
emerin and, 677
Endocrine factors
adipocyte differentiation and,
236–38
Endocytosis
receptor-mediated
acidification of vacuolar
compartments and, 780
Endoderm
anteriorization of, 645
Endogluconases
in plant cell walls, 180
Endopeptidase
penicillin-binding protein
complex and, 407–8
Endoplasmic reticulum (ER)
outer nuclear membrane and,
671
Endosomes
Src kinases in, 516
V-ATPases in, 780
Endothelin-1 (ET-1)
Src kinases and, 543

Energy homeostasis
adipocytes and, 232
C/EBPα and, 242
Enteric bacteria
chemosensory system of, 459
Enzymes
in plant cell walls, 180–81
Epidermal growth factor (EGF)
adipocyte differentiation and, 237
tyrosine phosphorylation of β-catenin and, 132
Epidermal growth factor receptor (EGF-R)
activation of, 556
Src kinases and, 539–40
Epidermal root hairs
tip growth in, 720–21
Epithelial cells
cadherin-based adhesion in, 135–36
nuclear assembly in, 674
zonula adherens junctions in, 120
Erbstatin analogue tyrosine kinase inhibitor
axonal growth inhibition and, 441
Erythropoietin receptor (Epo-R)
WSXWS motif of, 546
Escherichia coli
aspartate receptor of, 473
cell cycle of, 415
cell division in, 401
cell shape and, 412–13
chaperonins and, 403
factors affecting, 410
cellular taxis of, 460
chemosensory system of, 459, 460–66
chemotaxing
swarm pattern generated by, 461
genes involved in cell division, 396–97
GTP-binding loop in, 402
intracellular signaling in, 458
membrane protein of FtsW and, 411
murein sacculus in, 404
penicillin-binding proteins of, 396, 405–8
peptidoglycan synthesis in
factors affecting, 410
Ethylene
photomorphogenesis and, 223
Euchromatin, 671
Eukaryotes
cyclin-dependent kinases in, 263–64
gene expression in, 670
intracellular signaling in, 458–59
morphogenesis in, 700–1
nuclear pore assembly in, 681
transcriptional regulation in, 1
Eukaryotic cells
microtubule-based motility and, 746
vacuolar compartments in acidification of, 780
Eukaryotic DNA replication, 293–327
CDC6 protein and, 302–6
CDC7/DBF4 protein kinase and, 311–12
initiation of
proteins required for, 295–314
regulation of, 318–25
initiation factors and, 312–14
MCM proteins and, 306–11
origins of, 295
protein complex assembly at, 314–18
Expansin(s)
acid growth response of plant cell walls and, 187–89
Expansin gene family, 189–91
Extensibility
growing plant cell walls and, 185–86
Ezrin
phosphorylation of, 563–64
in zonula adherens junction, 136

F

F3
Src kinases and, 549–50
F11
Src kinases and, 549–50
Falke, J. J., 457–504
Fankhauser, C., 203–25
Fascin, 153–54
Fc receptor, 522
Fear response
Fyn disruption and, 579
Fibroblast(s)
cadherin-based adhesion in, 135–36
Fibroblast growth factor (FGF)
mesoderm induction and, 614
meso-endoderm induction and, 622–24
neural induction in embryo and, 655
Fibroblast growth factor (FGF) receptor
axonal growth and guidance and, 427, 441–44
Src kinases and, 540
Fibronectin
integrin receptors for, 533
Fibronectin domains
cell adhesion and, 371–72
Fibronectin-III
cell adhesion and, 378–79
immunoglobulin superfamily and, 428–30
Field emission in-lens scanning EM (FEISEM)
nuclear structure and, 670
Fimbrin
in epithelial brush border, 153
Flagella
microtubules and, 84
Flavin adenine dinucleotide (FAD)
blue light receptor and, 206
Fletterick, R. J., 745–73
Flowering
phytochromes and, 209
Fluorescence perturbation
microtubule turnover and, 103
Focal adhesion(s), 120
formation/disassembly of
Src kinases and, 560–62
Src kinases and, 516
Focal adhesion kinase (FAK)
activation of, 531, 545
proteins associating with, 531–33
Fodrin cytoskeleton
cadherin-catenin complex and, 137
Forgac, M., 779–800
Fowler, J. E., 697–736
Fremyella diphosiphon
chromatic adaptation in sensor for, 212
FtsA protein, 409
MreB protein and, 416
FtsE protein, 412
FtsK protein, 411
FtsL protein, 411
FtsN protein, 411
FtsQ protein, 409
FtsW protein, 411–12
FtsZ cytoskeleton, 397–98
FtsZ protein, 397–398
abundance of, 400
chaperonins and, 403
conservation of, 401–2
constriction of, 402–3
location of, 400–1
membrane anchors and, 403
tubulin and, 398–400
FtsZ protofilaments/mini-rings, 399
Fucus zygotes
morphogenesis in, 703–10

Fungi
cell wall expansion in, 183
Fusicoccin
plant cell wall polysaccharide biosynthesis and, 184
Fusome, 149

G

GAL genes
negative regulation of, 8
Gant, T. M., 669–89
Gap junction(s)
Src kinases and, 555
Gap junction-mediated communication
cadherin function and, 133–34
Gastropods
handedness in, 56–57
Gastrula
early
dynamic marginal zone of, 632–33
Gastrula organizer
early
organization of, 634–36
formation of
late steps of, 636–38
functions of, 639–45
regions of, 647–48
Gastrulation
Spemann organizer and, 613
General import pore (GIP), 33–34
Genetic analysis
negative transcriptional regulation and, 6–11
transcriptional regulatory mechanisms and, 2
Gene transcription
Src kinases and, 572–73
Gerhart, J., 611–58
Gibberellins
photomorphogenesis and, 223
Glucagon
adipose tissue and, 231
β-Glucanases
cell wall loosening and, 191
Glucocorticoids
adipocyte differentiation and, 236–37
adipose tissue and, 231
Glucose
SUC2 gene expression and, 7–8
Glycan
bacterial cell division and, 408–9
Glycine-rich protein (GRP)
in plant cell walls, 179
Golgi-derived vesicles
V-ATPases in, 780
GPI-linked receptors
Src kinases and, 548–51
G protein(s)
kinesin motors and, 756–59
G protein-coupled receptors (GPCRs)
Src kinases and, 542–46
Gram-negative bacteria
cell division in
osmotic pressure and, 397
murein sacculus in, 404
Gram-positive bacillis
spore formation by, 415
Gram-positive bacteria
cell division in
autolysins and, 412
osmotic pressure and, 397
Granulocyte macrophage colony stimulating factor receptor (GM-CSF-R)
WSXWS motif of, 546
Grass pollen
major allergens in, 190
Gravitropism
phytochromes and, 209
Green algae
gonidial embryo of
development of, 711–12
Growth cone, 426–27
Growth factor
cadherin-based cell adhesion and, 131
Growth factor receptors
Src kinases and, 568
Growth hormone (GH)
adipocyte differentiation and, 237–38
GTP
FtsZ division protein and, 398–400
MukB protein and, 413
GTPase
actin cytoskeleton and, 718
cell morphogenesis and, 707
nuclear vesicle fusion and, 679
Rho family of, 156–58
GTP hydrolysis
dynamic instability and, 91–94
microtubule structure and, 99–100
soluble tubulin and, 95
Gumbiner, B. M., 119–41

H

Haemophilus
penicillin-binding protein of, 407
Handed asymmetry
establishing and maintaining, 55
Handedness
embryonic
control of, 56
in invertebrate embryos
control of, 56–64
mechanisms of choice in, 73–78
Handedness bias, 54–56
Harland, R., 611–58
Heat shock protein 70
mitochondrial protein import and, 28, 41
Tim machinery and, 38–40
Hematopoietic cells
apoptosis in
Src kinases and, 571
Src kinases expressed in, 516
Hemicellulose
in plant cell walls, 176–77
Hemidesmosomes, 120
Hepatocyte growth factor/scatter factor
tyrosine phosphorylation of β-catenin and, 132
Herbimycin, 132
Heterochromatin, 671
Hippocampus
Fyn disruption and, 578–79
Histidine kinase
intracellular signaling in prokaryotes and, 458
HO gene
negative regulation of, 8
Hönlinger, A., 25–46
Homophilic binding
immunoglobulin domains and, 430
Human chromosome 18
tumor suppressor gene on, 446
Human growth hormone receptor (HGHR)
FN-III domain homologue and, 378–79
Hwang, C.-S., 231–52
Hydrocephalus
X-linked
L1 gene mutations and, 431
Hydroxyproline-rich glycoprotein (HRGP)
in plant cell walls, 179
Hypoxia
Src kinases and, 555–57

I

Ibuprofen
adipocyte differentiation and, 239
Immune recognition receptors (IRRs)
Src kinases and, 522–29

Immune response
immune recognition receptors and, 522
Immunoglobulin
neural cell adhesion molecules and, 427–28
Immunoglobulin cell adhesion molecules (Ig CAMs), 427–30
axonal growth and, 430–35
Immunoglobulin domain, 428
cell adhesion and, 367–71
homophilic binding and, 430
Immunoglobulin superfamily
fibronectin-III and, 428–30
growth/guidance in nervous system and, 429
Immunoreceptor tyrosine activation motif (ITAM), 522
Indomethacin
adipocyte differentiation and, 239
Influenza virus
membrane fusion in, 781
Initiation factors
eukaryotic DNA replication and, 312–14
Initiator proteins, 295
1,4,5-Inositol trisphosphate receptor
Src kinases and, 554
Insect midgut
V-ATPases and, 784
Insulin
adipocyte differentiation and, 236–37
adipose tissue and, 231
Insulin-like growth factor-1 (IGF-1)
adipocyte differentiation and, 236–37
Insulin receptor
Src kinases and, 540–41
Integrin(s)
focal adhesions and, 560–62
Src kinases and, 529–35
Integrin-based cell adhesion, 131
Integrin binding
VCAM-1 and, 376
Integrin I
cell adhesion and, 383–86
Integrin receptor
axonal growth and guidance and, 427
Intercellular adhesion molecule (ICAM)
immunoglobulin domain of, 371
Interleukin-2 receptor (IL2-R)
Src kinases and, 546–48
WSXWS motif of, 546
Intermediate filaments, 84
Intracellular membrane organelles
transport of
microtubules and, 746
Intranuclear filaments, 686–88
Invertebrate embryos
handedness in
control of, 56–64
left-right asymmetry in, 55
Irradiation
Src kinases and, 555–57

K

Kar3
microtubule destablization and, 108
Kartagener's syndrome, 64–65, 77–78
Keratinocytes
differentiation of
exposure to Ca^{2+} and, 552
Kimble, J., 333–54
Kinases
microtubule associated proteins and, 106–7
See also Cyclin-dependent kinases
Kinesin(s)
microtubule destabilization and, 108–9
Kinesin motility
structural basis of, 768–73
Kinesin motors, 745–73
architecture of, 753–68
hinges of, 765–66
interaction with
macromolecules, 766–68
motor domain of, 753–60
oligomerization domains of, 760–65
properties of, 752
structural features of, 747
Kinesin superfamily
molecular taxonomy of, 747–53

L

L1
axonal growth properties of, 433–34
function of
perturbation with antibodies, 432
mutations in
neurological disease and, 431–32
Lamellipodia
Src kinases and, 562–64
Lamin(s), 669
nuclear pore complex assembly and, 684
targeting nuclear vesicles to chromatin and, 676–77
Lamin A, 670
Lamina
nuclear
assembly of, 685–87
Lamin-associated proteins (LAPs), 669, 670–71
isoforms of, 677
Lamin B, 669, 670
Lamin B receptor (LBR), 669, 671
nuclear membrane protein sorting and, 685
vesicle targeting to chromatin and, 678–79
Lane, M. D., 231–52
Lateral signaling, 345–47
Leahy, D. J., 363–89
Left-right asymmetry, 53–78
in nematodes, 58–61
Spemann organizer and, 612
in vertebrates
development of, 64–71
vs. bilateral symmetry, 56, 78
Left-right polarity reversal
twinning and, 71–73
Leptin
energy intake/expenditure and, 232
pleiotropic role of, 251–52
Leptin receptor, 249–50
LexA
Srb/mediator proteins and, 14
Ligand-gated channels
Src kinases and, 553–55
Light microscopy
nuclear structure and, 670
Light signaling
circadian rhythms and, 223
Light signal transduction, 203–25
downstream targets of, 224
Limnea
sinistral mutations in, 57–58
spiral cleavage in, 56–57
LIN-12/Notch receptors
DSL transmembrane proteins and, 336
LIN-12/Notch signaling pathway, 333–54
biological roles of, 352–53
cell interactions controlled by, 339–44
components of, 339, 340–41
interactions of, 349–50
regulation of, 344–50
specificity of, 350–51
Liver
ADD1/SREBP1 expressed in, 245–46

LNG receptors, 336–37
Loftus, T. M., 231–52
Long-term potentiation (LTP)
  Fyn disruption and, 578–79
Lysosomal enzymes
  targeting of
    vacuolar acidification and, 781–82
Lysosomal storage disease, 793
Lysosomes
  acid hydrolases of, 784–85
  V-ATPases in, 780
Lytic transglycosylase
  penicillin-binding protein complex and, 407–8

M

Macromolecules
  interactions with kinesin motors, 766–68
Macrophages
  vacuolar (H^+)-ATPase and, 783
Maize coleoptiles
  arabinoxylan of, 192
Major histocompatibility molecules
  immunoglobulin-like domain of, 367
Major histocompatibility receptors
  Src kinases and, 522–29
Mammalian brain
  neurons in, 426
Mammalian cells
  actin cytoskeleton in regulation of, 718
  cyclin gene transcription in, 273
  morphogenesis in, 701
Mammalian embryos
  handedness in, 77
Mandrup, S., 231–52
Mannans
  binding to cellulose, 177
MASA syndrome
  L1 gene mutations and, 431
MCM proteins
  eukaryotic DNA transcription and, 306–11
Meiosis
  chromosome segregation in microtubules and, 746
Meiotic genes
  repression of, 9
Melanoma cells
  Src activation and, 533
Membrane organelles
  transport of
    microtubules and, 746
Membrane proteins
  nuclear
    sorting of, 685
Membrane ruffles
  Src kinases and, 562–64
Membrane traffic
  vacuolar (H^+)-ATPase and, 781–83
Mental retardation
  X-linked
    L1 gene mutations and, 431
Mesoderm
  dorsalization of, 642–43
  intermediate, 656–57
Meso-endoderm inducer, 620–24
Meso-endoderm induction, 614–20
Microtubule(s)
  interaction with actin cytoskeleton, 154–55
  kinesin motors and, 759–60
  processes requiring, 746
  structure of, 85–88
    GTP hydrolysis and, 99–100
Microtubule associated proteins (MAPs), 105–7
  regulation of, 106–7
Microtubule destabilizing factors, 107–9
Microtubule dynamic instability, 90
  functions of, 100–2
Microtubule dynamics, 83–111
  evolution of, 110–11
  in vitro, 88–100
  in vivo, 100–10
    features of, 103–5
    methodology for analysis of, 102–3
Microtubule ends
  stabilizing structure at, 94–95
Microtubule nucleating factors, 109–10
Microtubule severing proteins, 109
Microtubule stabilizing factors, 105–7
Microvesicles
  V-ATPases and, 784
Mitchison, T. J., 83–111
Mitochondria
  inner membrane of, 26
    preprotein translocase of, 37–40
    protein transport machinery of, 30–31
  outer membrane of, 26
    dynamic translocase of, 33–37
    protein transport machinery of, 30–31
  preprotein targeting to, 28–33
Mitochondrial matrix
  folding of proteins imported into, 41–43
Mitochondrial preprotein translocase, 25–46
Mitochondrial processing peptidase (MPP), 41
Mitochondrial protein import
  steps in, 26–28
Mitochondrial stimulation factor (MSF)
  mitochondrial protein import and, 28
Mitochondrial surface
  preprotein targeting to, 32
  protein import receptors on, 29–33
Mitochondrial targeting signals, 28–29
Mitosis
  chromosome segregation in microtubules and, 746
  microtubules and, 84
  nuclear membrane disassembly during, 675
  Src kinases and, 568–70
Mitotic spindle, 84
Moesin
  in zonula adherens junction, 136
Molecular analysis
  transcriptional regulatory mechanisms and, 2
Molecular chaperones
  mitochondrial protein import and, 26–28, 41
Morgan, D. O., 261–86
Morphogen(s), 630–31
  localization of
    microtubules and, 746
Morphogenesis
  in animal cells, 701–3
  gastrula organizer and, 640–42
  in nonvascular plants, 703–12
  in prokaryotes, 699–700
  in vascular plants, 712–33
  in yeast, 700–1
  See also Plant cell morphogenesis
Moss
  tip growth in, 710–12
Mouse
  DSL homologues in, 351
  LNG homologues in, 351
  neural functions in
    Fyn disruption and, 577–79
  obese mutation in, 247–48
  Src disruption in
    effects of, 573–76
  Src/Fyn disruption in
    effects of, 579–80

T cell development in
Fyn/Lck disruption and, 576–77
Mouse embryo
left-right asymmetry in, 67
Mouse embryo compaction
E-cadherin activation during protein kinase C and, 131–32
MreB protein
FtsA and, 416
MukB protein
chromosome segregation and, 413–14
Murein
structure and stability of, 404–5
Muscular dystrophy
emerin and, 677
Mutation
L1 gene
neurological disease and, 431–32
pleiotropic
photomorphogenesis and, 220–22
sinistral
in *Limnea*, 57–58
Mycoplasmas
GTP-binding loop in, 402
Myelin
peripheral nerve
major structural component of, 376–78
Myelin-associated glycoprotein (MAG), 431
axonal growth and, 447–49
Myelination
Fyn disruption and, 579
Myelin sheath
autotypic junctions in, 120
Myofibers
intercalated discs between, 120
Myosin
kinesin motors and, 756–59
Myosin light chain kinase
C-terminal domain of, 370

N

Nematodes
handedness in, 58–61, 76
left-right asymmetry in, 55
left-right axis in
dorsal-ventral axis and, 73
sinistral, 61
Netrins
axonal growth and guidance and, 427
receptor for, 446–47
Neural cell adhesion molecule (NCAM)
axonal growth and, 435–37
characterization in brain, 427
genetic manipulation of, 438
immunoglobulin-like domain of, 367
immunoglobulins and, 427–28
variable alternatively spliced exon and, 437
Neural crest cells
cadherin-based adhesion in, 135–36
Neural functions
in mice
Fyn disruption and, 577–79
Neurectoderm
caudalization of, 653–56
Neurite outgrowth
chick NrCAM and, 433
Neurofascin, 433
Neurological disease
L1 gene mutations and, 431–32
Neuron(s)
kinesin heavy chains in, 760–61
in mammalian brain, 426
Src kinases expressed in, 515–16
Neuronal process outgrowth
signal transduction and, 138
Neurospora
central vacuoles of
V-ATPases in, 780
intracellular signaling pathways in, 458
Neutrophils
vacuolar (H^+)-ATPase and, 783
Nicotinic acetylcholne receptor (n-AChR)
Src kinases and, 553–54
Nieuwkoop center, 626–27
NMDA receptor
Src kinases and, 554–55
Non-teleost fish
blastopore of
organizer in, 613
Nonvascular plants
morphogenesis in, 703–12
Notochord
morphological asymmetry and, 68
Nuclear assembly, 669–89
experimental systems and, 672
Nuclear disassembly, 671
Nuclear envelope (NE)
assembly of, 674–84
growth of, 684–88
structure and dynamics of, 670–72
Nuclear lamina, 670–71
assembly of, 685–87
Nuclear membrane
inner
proteins localized in, 669
Nuclear membrane proteins
sorting of, 685
Nuclear pore complexes (NPCs)
assembly of, 680–84
intermediates in, 669
molecules diffusing through, 670
Nuclear vesicles
characterizing, 674–75
fusion of, 679–80
targeting to chromatin, 675–79
Nucleocytoplasmic transport
nuclear envelope growth and, 684
Nucleoid occlusion
bacterial cell division and, 413
Nucleoporin mutation
nuclear membrane morphology and, 684
Nucleus
Src kinases in, 516
Nurse cell cytoplasmic actin bundle assembly, 151–54

O

obese gene
control in fully differentiated adipocytes, 250–51
transcriptional activation of, 250
obese mutation, 247–48
Obesity
leptin signaling and, 232
Oogenesis
Drosophila, 148–50
Op18
microtubule destabilization and, 107–8
Organogenesis
laterality in
control of, 70–71
Origin recognition complex (ORC), 295–96
biochemical properties of, 296–302
Osmotic pressure
bacterial cell division and, 397
Osteoclasts
plasma membrane V-ATPases in, 783–84
Src activation and, 533
Src disruption and, 574–76
Src kinases expressed in, 515
Osteopetrosis
Src disruption and, 573–74
Osteopontin
Src activation and, 533

Otefin
nuclear membrane protein sorting and, 685
Ovarioles, 148

P

Paracrine factors
adipocyte differentiation and, 238–40
Pea
expansin cDNA in, 189
Pea seedlings
phototropism in
light fluence requirements for, 208
Pectinases
in plant cell walls, 180
Pectin(s)
in plant cell walls, 177
Pectin methyl esterases
in plant cell walls, 180
Pelvetia zygotes
morphogenesis in, 703
Penicillin-binding proteins (PBPs), 396, 405–8
Peptide hormones
cadherin-based cell adhesion and, 131
Peptidoglycan synthesis
septal
bacterial cell division and, 404–12
Peptidyl-prolyl *cis/trans* isomerase (PPIase)
cyclosporin A and, 41
Peripheral myelin protein zero
cell adhesion and, 376–78
Peripheral nerve myelin
major structural component of, 376–78
Periseptal annulus
bacterial cell division and, 413
Peroxisome proliferator-activated receptor (PPAR)
adipocyte differentiation and, 240, 243–45
Pertussis toxin
axonal growth inhibition and, 441
Pfanner, N., 25–46
Phloem
hydroxyproline-rich glycoproteins and, 179
Phosphorylation
activation of cyclin-dependent kinases and, 275–78
inhibition of cyclin-dependent kinases and, 280–82
lamin B receptor binding and, 678
microtubule associated proteins and, 106–7
See also Tyrosine phosphorylation
Photoactivation of fluorescence
microtubule turnover and, 103
Photobleaching
microtubule turnover and, 103
Photomorphogenesis, 205
mutants in *Arabidopsis*, 218–19
repressors of, 220–23
Photoreceptors, 204–5
hypocotyl elongation and, 215–16
Phototropism
blue light-mediated, 207–8
phytochromes and, 209
Phragmoplast
cytokinesis and, 727–30
Phragmoplastin
vesicle fusion at cell plate and, 729–30
Phytochromes, 204–5, 209–16
signal transduction and, 217–24
specific functions for, 213–16
structure and function analysis of, 209–13
Phytochromobilin, 213–14
PI 3-K isozyme
DNA synthesis and, 567–68
Pilus-associated protein
immunoglobulin-like domain of, 367
Pine
expansin cDNA in, 189
Plakoglobin
cadherin-catenin complex and, 128
Plant(s)
blue light responses in, 206–9
central vacuoles of
V-ATPases in, 780
nonvascular
morphogenesis in, 703–12
vascular
cell division in, 721–33
cell wall expansion in, 712–21
morphogenesis in, 712–33
Plant cell morphogenesis, 697–736
patterns of, 698
Plant cell walls, 171–94
acid growth response of expansins and, 187–89
assembly of, 181–83
enzyme-mediated, 182–83
expansion of, 183–91
cessation of, 191–93
primary
architecture of, 172–81
Plant development
light control of, 203–25
Plant hormones
de-etiolation mutants and, 222–23
Plasma membrane
interactions with actin microfilaments, 705
vacuolar (H^+)-ATPase and, 783–84
Platelet(s)
Src kinases expressed in, 515
Platelet activating factor (PAF)
Src kinases and, 543
Platelet aggregation
Src kinases and, 562
Platelet-derived growth factor (PDGF)
adipocyte differentiation and, 237
Platelet-derived growth factor (PDGF) receptor
Src kinases and, 537–39
PLC gamma inhibitor
axonal growth inhibition and, 441
Pleiotropic mutation
photomorphogenesis and, 220–22
Polar growth
cortical site for, 705–7
Pollen
vegetative and generative cells in, 731
Pollen mitosis I (PMI), 731
Pollen tube
growth of, 713–20
wall expansion in, 193
Polysaccharides
in plant cell walls, 177–79
Polysialic acid
neural cell adhesion molecules and, 435–37
Polysialytransferases
neural cell adhesion molecules and, 435–37
Potassium channels
Src kinases and, 553
Potassium transport
V-ATPases and, 780
Preadipocytes, 235
Profilin
filament polymerization and, 152
Prokaryotes
gene expression in, 670
intracellular signaling in, 458
morphogenesis in, 699–700

Prolactin receptor (Prl-R)
WSXWS motif of, 546
Proliferating cell nuclear antigen (PCNA), 674
Proline-rich protein (PRP)
in plant cell walls, 179
Propranolol
neurotransmitter uptake and, 784
Prostacyclin
adipocyte differentiation and, 239–40
Prostaglandins (PGs)
adipocyte differentiation and, 239
Protein degradation
cell cycle transitions and, 322
Protein kinase(s)
RNA polymerase II
carboxy-terminal domain phosphorylation and, 18
Protein kinase A
hedgehog signaling pathway in *Drosophila* and, 162–63
Protein kinase C
E-cadherin activation and, 131–32
tight junction assembly and, 138
Protein translocation, 25–46
mechanistic principles of, 43–46
post-translational
cytosolic chaperones and, 28
Proteolysis
cyclin and, 274–75
Pterin
blue light receptor and, 206

Q

Quatrano, R. S., 697–736

R

Radixin
in zonula adherens junction, 136
Rana pipiens
gastrula ectoderm of
neural tissue differentiation and, 650–51
Ras-MAP kinase pathway
Shc stimulating, 566–67
Rat
DSL homologues in, 351
LNG homologues in, 351
RecA protein
activation of
bacterial SOS response and, 417
Receptor cytoplasmic domain, 482–89
CheR methyltransferase and, 486–87
CheW protein and, 489
linker region of, 484
methylation region of, 485–86
signaling domain and, 487–89
transmembrane signaling helix and, 482
Receptor-kinase signaling complex, 469–94
Receptor-mediated endocytosis
acidification of vacuolar compartments and, 780
Receptor phosphatases
axonal growth and guidance and, 427, 444–46
Receptor protein tyrosine kinases (RPTKs)
Src kinases and, 536–42
Renal acidification
V-ATPases and, 780
Replication competence
functional nuclear envelope and, 674
Replication licensing factor (RLF), 316–18
Replicators
DNA replication and, 295
Retina
cell adhesion in, 427
Retinoic acid (RA)
adipocyte differentiation and, 238, 246
Retinoic acid receptor (RAR)
effects of retinoids and, 246
Retinoid X receptor (RXR)
effects of retinoids and, 246
Ribosomes
preproteins released from, 28
Rice
expansin cDNA in, 189
Ring canals, 148–49
assembly and function of, 163–66
RNA polymerase II
cyclin-dependent kinases and, 265
Srb/mediator proteins and, 14
RNA polymerase II
carboxy-terminal domain, 1–19
phosphorylation of, 17–19
transcriptional repression and, 6–11
truncation of, 3–4
suppression of, 4–5
RNA polymerase II holoenzyme
Srb proteins and, 5–6
RNA polymerase II transcription factor
cyclin-like fold in, 269
RNA processing
nuclear envelope and, 670
Robinson, D. N., 147–66
Root hairs
tip growth in, 720–21
Root meristem
asymmetric division in, 731–32
Rous sarcoma virus (RSV)
cell differentiation and, 571
transforming protein of, 514

S

Saccharomyces cerevisiae
α2 repression in, 9–10
CDC6 protein of, 302–4
cell cycle in
cyclin-dependent kinases and, 265
cell-free nuclear assembly and, 672
cyclin gene transcription in, 273–75
DNA replication in
mitotic kinase activity and, 323–24
GAL genes in
negative regulation of, 8
GAL11 mutation in, 11–12
HO gene in
negative regulation of, 8
inositol auxotrophy in, 3–4
intracellular signaling pathways in, 458
Kar3p kinesin motor of, 767
MCM proteins of, 309
meiotic genes in
repression of, 9
morphogenesis in, 700–1
motor genes in, 746
mutant phenotypes in, 12–13
origin recognition complex of
biochemical properties of, 296–302
origins of DNA replication in complexes assembling at, 319
dynamic structures at, 314–16
RNA polymerase II CTD function in
analysis of, 3–6
Srb/mediator components in positive regulatory roles for, 12
Srb/mediator proteins in
roles of, 13–19

stress-response gene in regulation of, 10
SUC2 gene expression in glucose repression of, 7–8
transcriptional regulation in genetics of, 1–19
negative, 6–11
positive, 11–13
Ty insertion mutations in suppression of, 10
UAS-less promoters in expression of, 10–11
Sacculus, 404–5
Salmonella typhimurium
aspartate recognition in, 474
cellular taxis of, 460
chemosensory system of, 459, 460–66
Saprolegnia
cell wall expansion in, 183
Schizosaccharomyces pombe
CDC6 protein of, 304–5
MCM proteins of, 309
origin recognition complex of, 300–1
Schlerenchyma
hydroxyproline-rich glycoproteins and, 179
Search-capture model
microtubule dynamic instability and, 100–2
Sea urchin(s)
kinesin motor in, 761
left-right asymmetry in, 55
left-right axis in dorsal-ventral axis and, 73
LNG homologues in, 351
Sea urchin eggsocyte
nuclear assembly and, 672
Sea urchin embryo
left-right polarity in, 76–77
Sea urchin vesicle
chromatin binding, 675–76
Second messenger cascades
cell adhesion molecules triggering, 439–40
Secretory organelles
V-ATPases and, 784
Seed germination
light and, 204
phytochromes and, 209
Selectin
Src kinases and, 536
Semaphorins
axonal growth and guidance and, 427
Septal peptidoglycan synthesis
bacterial cell division and, 404–12
Shade-avoidance response
phytochromes and, 209
Shc
tyrosine phosphorylation of, 566–67
Shigella flexneri
invasion of cells by Src kinases and, 563
Signaling pathways
Srb/mediator proteins and, 17
Signal transduction
cadherins and, 137–40
light, 203–25
downstream targets of, 224
phytochrome/cryptochrome, 217–24
soluble receptors and, 467–69
Signal transduction pathways
early embryo patterning and, 616
kinesin motor protein and, 746
meso-endoerm formation and, 614
Simpson, P., 333–54
Sinistral mutation
in *Limnea*, 57–58
Situs inversus viscerum, 64
Snails
handedness in, 56–57, 75
Sorghum
phytochrome apoprotein mutants in, 214
SOS response
bacterial, 417
Spastic paraplegia type 1
L1 gene mutations and, 431
Spemann organizer, 611–58
induction of, 614–20
Sperm flagella
Kartagener's syndrome and, 64
Spiral cleavage
in *Limnea*, 56–57
Spore formation
bacterial cell division and, 415
Sporulation
in yeast, 9
SRB genes
mutations in RNA polymerase II carboxy-terminal domain and, 4–5
Srb/mediator components
positive regulatory roles for, 12
Srb/mediator genes, 3
SUC2 gene expression and, 7
Srb/mediator proteins, 1
genes encoding, 7
RNA polymerase II and, 14
roles in activation and repression, 13–19
signaling pathways and, 17
transcriptional repression and, 14–16
Srb proteins
RNA polymerase II holoenzyme and, 5–6
Src kinases, 513–84
activation of, 518–21
mechanisms involved in, 519
apoptosis and, 570–71
biologic activities of in vivo, 573–82
cadherins and, 535
cell adhesion and, 560
cell adhesion receptors and, 529–36
cell cycle progression and, 565–70
cell differentiation and, 571–72
cell migration and, 564–65
cellular events regulated by, 557–73
cytokine receptors and, 546–48
expression of, 515–16
focal adhesion formation/disassembly and, 560–62
gene transcription and, 572–73
GPI-linked receptors and, 548–51
G protein-coupled receptors and, 542–46
immune recognition receptors and, 522–29
integrins and, 529–35
lamellipodia and, 562–64
ligand-gated channels and, 553–55
major histocompatibility receptors and, 522–29
receptor pathways coupling with, 521–57
receptor protein tyrosine kinases and, 536–42
selectins and, 536
stress responses and, 555–57
structural domains of, 516–18
substrates for, 557–60
voltage-gated channels and, 551–53
Staphylococcus aureus
cell division in, 401
autolysins and, 412
Sterol regulatory element binding protein 1 (SREBP1), 245–46
Stevens, T. H., 779–800
Streptococcus
penicillin-binding protein of, 405–6
Streptomyces griseus
FtsQ homologues in, 409
Stress relaxation
growing plant cell walls and, 185–86

Stress responses
Src kinases and, 555–57
Structural proteins
in plant cell walls, 179–80
SUC2 gene expression
glucose repression of, 7–8
SulA protein
bacterial cell division and, 417
Surf clam eggoocyte
nuclear assembly and, 672
SV40
DNA replication and, 320
Synaptic plasticity
neural cell adhesion molecules and, 435–37
Synaptic vesicles
V-ATPases and, 780, 784
Synechocystis PCC6803
higher plant phytochromes and, 212

T

TATA-binding protein (TBP)
Srb proteins and, 5
T cell(s)
antigen recognition by
TCR/CD3 complex and, 523
development in mice
Fyn and Lck disruption and, 576–77
T cell receptor (TCR), 522
components of, 523
immunoglobulin-like domain of, 367
induction of cell death and, 570
Teleost fish
organizer in, 614
Telokin
immunoglobulin-like domain of, 370
Thomas, S. M., 513–84
Thrombin
Src kinases and, 543–44
Thy-1
Src kinases and, 549
Thymocytes
maturation of
Fyn disruption and, 576
Thyroid hormone
adipocyte differentiation and, 238
Tim machinery
carrier proteins and, 40
heat shock protein 70 and, 38–40
Titin
immunoglobulin-like domain of, 367, 371
Tomato
expansin cDNA in, 189
phytochrome apoprotein mutants in, 214
Tradescantia
cell division in, 723
Transcriptional regulation
negative
genetic analysis of, 6–11
positive
genetic analysis of, 11–13
in yeast
genetics of, 1–19
Transcriptional repression
Srb/mediator proteins and, 14–16
Transcription factors
adipocyte differentiation and, 240–47
meso-endoderm induction and, 624
Transferrin receptor
recycling of, 781
Transforming growth factor (TGF)
adipocyte differentiation and, 237
Transforming growth factor-β (TGF-β) family
meso-endoderm induction and, 614, 621–22
Transglycosylase
penicillin-binding protein complex and, 407–8
Transmembrane aspartate receptor, 471
aspartate-binding site of, 474
periplasmic sensory domain of, 472
Transmembrane signal
molecular view of, 478–82
receptor-mediated, 475–82
Transmembrane signaling domain
structure of, 475–76
Transmembrane signaling helix
displacement of
aspartate-induced, 479
identification of, 476–78
receptor cytoplasmic domain and, 482
Transmission electron microscopy (TEM)
nuclear structure and, 670
Treadmilling, 88
Triiodothyronine
adipocyte differentiation and, 236
Tropomyosin II
Drosophila oocyte and, 155–56
Tubulin, 84
dynamic instability of, 89–91
FtsZ division protein and, 398–400
GTP hydrolysis and, 95
microtubule structure and, 85–88
self-assembly of
reversible, 88
Tubulin depolymerization mechanism
membrane movement in *Xenopus* extracts and, 403
Tubulin polymerization
electron microscopy and, 97
Tubulin polymerization cycle
thermodynamics of, 93
Tumor cells
plasma membrane V-ATPases and, 784
Tumor growth factor-β
cytoplasm transport in *Drosophila* oocyte and, 158–59
Tumor metastasis
V-ATPases and, 780
Tumor necrosis factor (TNF)
adipose tissue and, 231
Tumor necrosis factor-α (TNF-α)
adipocyte differentiation and, 240
Tumor necrosis factor receptor (TNFR), 546
Twinning
left-right polarity reversal and, 71–73
Two-hybrid screening
identification of interacting gene products and, 2
Tyrosine kinases
non-receptor
axonal growth and, 440–41
Tyrosine phosphorylation
axonal growth and guidance and, 444–46
cadherin function and, 132–33
focal adhesions and, 561
regulation of biologic responses and, 514

U

Urochordates
organizer in, 613–14
Urodeles
gastrula ectoderm of
neural tissue differentiation and, 650–51
gastrula organizer in, 634

V

Vacuolar (H^+)-ATPase, 779–800
accessory V_1 subunits of

structure and function of, 790–91
biosynthesis and assembly of, 794–96
domain structure and organization of, 785–88
functions of, 781–85
intracellular targeting of, 796
nucleotide binding V_1 subunits of
structure and function of, 788–90
structural model of, 785, 786
subunit composition of, 785
V_0 subunits of
structure and function of, 791–94
Vacuolar acidification
ligand movement and, 781
regulation of, 796–99
targeting of lysosomal enzymes and, 781–82
Vacuolar compartments
acidification of, 780
Vale, R. D., 745–73
Variable alternatively spliced exon (VASE)
neural cell adhesion molecules and, 437
Vascular cell adhesion molecule (VCAM)
immunoglobulin domain of, 371
Vascular cell adhesion molecule-1 (VCAM-1)
immunoglobulin-like domain of, 367, 376
integrin binding and, 376
Vascular plants
cell division in
spatial regulation of, 721–33
cell wall expansion in
spatial regulation of, 712–21
morphogenesis in, 712–33
Vasopressin
Src kinases and, 544
V-ATPase
See Vacuolar (H^+)-ATPase
Vertebrate(s)
LIN-12/Notch signaling pathway and, 351–52
Vertebrate embryos
control of handedness in, 64–73
Villin
in epithelial brush border, 153
Vinculin
in zonula adherens junction, 136
Voltage-gated channels
Src kinases and, 551–53
Volvox
asymmetric division in, 710–12
Volvox carteri
gonidial embryo of
development of, 711–12

W

Walsh, F. S., 425–50
Water
in plant cell walls, 174
Wheat germ agglutinin (WGA)
nuclear pore assembly and, 682–83
Wilson, K. L., 669–89
Wnt signaling pathway
activation of, 629–30
Wood, W. B., 53–78

X

Xenopus
DSL homologues in, 351
early development in
kinesin motor protein and, 746
left-right asymmetry in, 55
LNG homologues in, 351
Xenopus eggs
Wnt signaling pathway in, 628
Xenopus embryos
morphological asymmetry in, 68–70
Xenopus extracts
endoplasmic reticulum vesicles in, 674
membrane movement in
tubulin depolymerization mechanism and, 403
nuclear envelope assembly in, 683
nuclear pore assembly in, 682
nuclear vesicle fusion in, 679
Xenopus laevis
CDC6 protein of, 305
MCM proteins of, 310
origin recognition complex of, 301
replication licensing in, 316–18
Xenopus laevis eggs⁄oocytes
nuclear assembly and, 672, 673
XKCM1
microtubule dynamics and, 109
X-linked hydrocephalus
L1 gene mutations and, 431
X-linked mental retardation
L1 gene mutations and, 431
Xylans
binding to cellulose, 177
Xylem
proline-rich proteins and, 179
Xyloglucan, 176–77
Xyloglucan endotransglycosylase (XET)
in plant cell walls, 180, 182–83
Xylosidases
in plant cell walls, 180

Y

Yap, A. S., 119–41
Yeast
actin cytoskeleton in
regulation of, 718
central vacuoles of
V-ATPases in, 780
cyclin-dependent kinase in, 262–63
cyclin gene transcription in, 273–75
morphogenesis in, 700–1
signal transduction pathways in
second site suppressors and, 217
transcriptional regulation in
genetics of, 1–19
V-ATPase complex in
biosynthesis and assembly of, 794–95

Z

Zebrafish
LNG homologues in, 351
Zebrafish embryo
morphological asymmetry in, 68–70
ZipA protein
FtsZ division protein and, 403
Zonula adherens junction, 120
functions of, 136–37
proteins in, 136
Zonula adherens proteins, 123
Zygotes
morphogenesis in, 703–10

CUMULATIVE INDEXES

CONTRIBUTING AUTHORS, VOLUMES 9–13

A

Almo, S., 10:207–49
Anderson, K. V., 12:393–416
Ayscough, K. R., 12:129–60

B

Barber, L. D., 9:163–206
Bass, R. B., 13:457–512
Bell, S. P., 13:293–332
Belvin, M. P., 12:393–416
Bevilacqua, M. P., 11:601–31
Bjorkman, P. J., 12:181–220
Bliska, J. B., 12:221–55
Bluestone, J. A., 11:307–53
Bradfield, C. A., 12:55–89
Brake, A. J., 12:519–41
Bramhill, D., 13:395–424
Brieher, W. M., 13:119–46
Brook, W. J., 12:161–80
Brown, K., 10:405–55
Brugge, J. S., 13:513–609
Bubeck, P., 11:379–416
Burridge, K., 12:463–518
Butler, S. L., 13:457–512

C

Carlson, M., 13:1–23
Cheney, R. E., 11:633–75
Chervitz, S. A., 13:457–512
Chory, J., 13:203–29
Chrzanowska-Wodnicka, M., 12:463–518
Cline, K., 12:1–26
Cohen, S. M., 12:161–80
Constantinescu, S. N., 12:91–128
Cooley, L., 13:147–70
Cooper, J. A., 11:497–518
Cosgrove, D. J., 13:171–201
Craig, E. A., 13:25–51
Cyr, R., 10:153–80

D

Danielson, M. A., 13:457–512
DeFranco, A. L., 9:377–410
Desai, A., 13:83–117
Desvergne, B., 12:335–63
Diaz-Benjumea, F. J., 12:161–80
Doherty, P., 13:425–56
Drubin, D. G., 12:129–60
Dutta, A., 13:293–332

E

Eichele, G., 10:121–52
Emr, S. D., 11:1–33

F

Falke, J. J., 13:457–512
Fankhauser, C., 13:203–29
Farnsworth, C. C., 10:181–205
Flamme, I., 11:73–91
Fletterick, R. J., 13:745–77
Forgac, M., 13:779–808
Fowler, J. E., 13:697–743
Franzoso, G., 10:405–55
Freeling, M., 12:257–304
Fuchs, E., 11:123–53

G

Galán, J. E., 12:221–55
Gant, T. M., 13:669–95
Gerhart, J., 13:611–67
Giehl, K., 11:379–416
Ginsberg, M. H., 11:549–99
Glomset, J. A., 10:181–205
Gumbiner, B. M., 13:119–46

H

Hall, A., 10:31–54
Harland, R., 13:611–67
Henry, R., 12:1–26
Hernandez, L. D., 12:627–61
Herschbach, B. M., 9:479–509
Hicks, G. R., 11:155–88
Hoffman, L. R., 12:627–61
Holzbaur, E. L. F., 10:339–72
Hönlinger, A., 13:25–51
Horazdovsky, B., 11:1–33
Hunter, T., 10:251–337
Hwang, C., 13:231–59
Hyman, A. A., 11:471–95

J

Jackson, M. R., 12:27–54
Jaffrey, S. R., 11:417–40
Jockusch, B. M., 11:379–416
Johnson, A. D., 9:479–509
Johnson, A. E., 10:87–119
Jordan, E. G., 11:93–121
Julius, D., 12:519–41

K

Khattri, R., 11:307–53
Kimble, J., 13:333–61
Klingmuller, U., 12:91–128
Koshland, D., 12:305–33
Kreis, T. E., 11:677–706
Kroemker, M., 11:379–416

L

Lane, M. D., 13:231–59
Lattman, E. E., 10:207–49
Leahy, D. J., 13:363–93
Lee, E. Y. P., 10:1–29
Lee, W., 10:1–29
Lehmann, R., 12:365–91
Leinwand, L. A., 12:417–39
Lemberger, T., 12:335–63
Leptin, M., 11:189–212
Lindberg, R. A., 10:251–337
Linhardt, R. J., 11:601–31
Lodish, H. F., 12:91–128
Loftus, T. M., 13:231–59
Loo, S., 11:519–48
Lowe, M., 11:677–706

M

Mandrup, S., 13:231–59
Mellman, I., 12:575–625
Mitchison, T. J., 13:83–117
Mooseker, M. S., 11:633–75
Morgan, D. O., 13:261–91
Morrison, S. J., 11:35–71
Moschner, J., 11:379–416

N

Nelson, R. M., 11:601–31

P

Parham, P., 9:163–206
Pepperkok, R., 11:677–706

Pfanner, N., 13:25–51
Pfeffer, S. R., 12:441–61
Ploegh, H. L., 11:267–306
Pollard, T. D., 10:207–49

Q

Quatrano, R. S., 13:697–743
Quirk, S., 10:207–49

R

Rüdiger, M., 11:379–416
Raghavan, M., 12:181–220
Raikhel, N. V., 11:155–88
Riley, D. J., 10:1–29
Rine, J., 11:519–48
Risau, W., 11:73–91
Robinson, D. N., 13:147–70
Rose, M. D., 12:663–95
Rothkegel, M., 11:379–416
Ruoslahti, E., 12:697–715
Ruppel, K. M., 12:543–73

S

Sassone-Corsi, P., 11:355–77
Schafer, D. A., 11:497–518
Schaller, M. D., 11:549–99
Schlüter, K., 11:379–416
Schmidt, J. V., 12:55–89
Schwartz, M. A., 11:549–99
Sciammas, R., 11:307–53
Selkoe, D. J., 10:373–403
Shao, Z., 11:241–65
Shaw, P. J., 11:93–121
Shenolikar, S., 10:55–86
Siebenlist, U., 10:405–55
Simpson, P., 13:333–61
Smith, L., 12:257–304
Snyder, S. H., 11:417–40
Socolovsky, M., 12:91–128
Somlyo, A. P., 11:241–65
Sorger, P. K., 11:471–95
Spector, D. L., 9:265–315
Sperling, A. I., 11:307–53
Spudich, J. A., 12:543–73
Stack, J. H., 11:1–33
Stamenkovic, I., 11:601–31
Stanke, G., 11:379–416
Stevens, T., 13:779–808
Strunnikov, A., 12:305–33
Sylvester, A. W., 12:257–304

T

Teasdale, R. D., 12:27–54
Theriot, J. A., 11:213–39
Thomas, S. M., 13:513–609
Tickle, C., 10:121–52

U

Uchida, N., 11:35–71

V

Vale, R. D., 13:745–77
Vallee, R., 10:339–72
van der Geer, P., 10:251–337
Venot, A., 11:601–31
Vinson, V., 10:207–49

W

Wahli, W., 12:335–63
Walsh, F. S., 13:425–56
Walter, P., 10:87–119
Watowich, S. S., 12:91–128
Weiss, A., 12:417–39
Weissman, I. L., 11:35–71
White, J. M., 12:627–61
Williamson, A., 12:365–91
Wilson, K. L., 13:669–95
Winkler, J., 11:379–416
Wolf, P. R., 11:267–306
Wolfsberg, T. G., 12:627–61
Wood, W. B., 13:53–81
Wu, C., 11:441–69
Wu, H., 12:91–128

Y

Yang, J., 11:241–65
Yap, A. S., 13:119–46

CHAPTER TITLES, VOLUMES 9–13

CELL-CELL INTERACTIONS		
Cell-Mediated Events that Control Blood Coagulation and Vascular Injury	C. T. Esmon	9:1–26
Biology of Animal Lectins	K. Drickamer, M. E. Taylor	9:237–64
Molecular Aspects of Epithelial-Mesenchymal Interactions	W. Birchmeier, C. Birchmeier	9:511–40
The Cell Biology of Infection by Intracellular Bacterial Pathogens	J. A. Theriot	11:213–39
Carbohydrate-Protein Interactions in Vascular Biology	R. M. Nelson, A. Venot, M. P. Bevilacqua, R. J. Linhardt, I. Stamenkovic	11:601–31
Cross-Talk Between Bacterial Pathogens and Their Host Cells	J. E. Galán, J. B. Bliska	12:221–55
Virus-Cell and Cell-Cell Fusion	L. D. Hernandez, L. R. Hoffman, T. G. Wolfsberg, J. M. White	12:627–61
Molecular and Functional Analysis of Cadherin-Based Adherens Junctions	A. S. Yap, W. M. Brieher, B. M. Gumbiner	13:119–46
CELL CYCLE AND ITS REGULATION		
The Role of GTP-Binding Proteins in Transport Along the Exocytic Pathway	S. Ferro-Novick, P. Novick	9:575–99
Mitotic Chromosome Condensation	D. Koshland, A. Strunnikov	12:305–33
Cyclin-Dependent Kinases: Engines, Clocks, and Microprocessors	D. O. Morgan	13:261–91
Initiation of DNA Replication in Eukaryotic Cells	A. Dutta, S. P. Bell	13:293–332
CELL DIVISION		
Bacterial Cell Division	D. Bramhill	13:395–424
CELL-EXTRACELLULAR MATRIX INTERACTIONS		
Tumor Cell Interactions with the Extracellular Matrix During Invasion and Metastasis	W. G. Stetler-Stevenson, S. Aznavoorian, L. A. Liotta	9:541–73
Cell Biology of the Amyloid β-Protein Precursor and the Mechanism of Alzheimer's Disease	D. J. Selkoe	10:373–403
The Molecular Architecture of Focal Adhesions	B. M. Jockusch, P. Bubeck, K. Giehl, M. Kroemker, J. Moschner, M. Rothkegel, M. Rüdiger, K. Schlüter, G. Stanke, J. Winkler	11:379–416
RGD and Other Recognition Sequences for Integrins	E. Ruoslahti	12:697–715
Genetic Analysis of the Actin Cytoskeleton in the *Drosophila* Ovary	D. N. Robinson, L. Cooley	13:147–70
Implications of Atomic-Resolution Structures for Cell Adhesion	D. J. Leahy	13:363–93
Neural Cell Adhesion Molecules of the Immunoglobulin Superfamily: Role in Axon Growth and Guidance	F. S. Walsh, P. Doherty	13:425–56

CELL GROWTH AND DIFFERENTIATION

Cytokine Receptor Signal Transduction and the Control of Hematopoietic Cell Development	S. S. Watowich, H. Wu, M. Socolovsky, U. Klingmuller, S. N. Constantinescu, H. F. Lodish	12:91–128
Germ Cell Development in *Drosophila*	A. Williamson, R. Lehmann	12:365–91
Adipocyte Differentiation and Leptin Expression	C. Hwang, T. M. Loftus, S. Mandrup, M. D. Lane	13:231–59

CELL MOTILITY

Life at the Leading Edge: The Formation of Cell Protrusions	J. Condeelis	9:411–44
Small GTP-Binding Proteins and the Regulation of the Actin Cytoskeleton	A. Hall	10:31–54
Structure of Actin-Binding Proteins: Insights about Function at Atomic Resolution	T. D. Pollard, S. Almo, S. Quirk, V. Vinson, E. E. Lattman	10:207–49
Dyneins: Molecular Structure and Cellular Function	R. Vallee, E. L. F. Holzbaur	10:339–72
The Cell Biology of Infection by Intracellular Bacterial Pathogens	J. A. Theriot	11:213–39
Unconventional Myosins	M. S. Mooseker, R. E. Cheney	11:633–75
Focal Adhesions, Contractility, and Signaling	K. Burridge, M. Chrzanowska-Wodnicka	12:463–518

CELL POLARITY

Light Control of Plant Development	C. Fankhauser, J. Chory	13:203–29
The LIN-12/Notch Signaling Pathway and Its Regulation	J. Kimble, P. Simpson	13:333–61
Formation and Function of Spemann's Organizer	R. Harland, J. Gerhart	13:611–67

CELL TRANSFORMATION

Tumor Cell Interactions with the Extracellular Matrix During Invasion and Metastasis	W. G. Stetler-Stevenson, S. Aznavoorian, L. A. Liotta	9:541–73
Structure, Regulation, and Function of NF-κB	U. Siebenlist, G. Franzoso, K. Brown	10:405–55

CELLULAR IMMUNOLOGY

Peptide Binding to Major Histocompatability Complex Molecules	L. D. Barber, P. Parham	9:163–206
Structure and Function of the B Cell Antigen Receptor	A. L. DeFranco	9:377–410
Superantigens: Bacterial and Viral Proteins that Manipulate the Immune System	M. T. Scherer, L. Ignatowicz, G. M. Winslow, J. W. Kappler, P. Marrack	9:101–28
Assembly and Intracellular Transport of MHC Class I Molecules	M. R. Jackson, P. A. Peterson	9:207–35
The Biology of Hematopoietic Stem Cells	S. J. Morrison, N. Uchida, I. L. Weissman	11:35–71
How MHC Class II Molecules Acquire Peptide Cargo: Biosynthesis and Trafficking Through the Endocytic Pathway	P. R. Wolf, H. L. Ploegh	11:267–306
TCR$\gamma\delta$ Cells: A Specialized T Cell Subset in the Immune System	J. A. Bluestone, R. Khattri, R. Sciammas, A. I. Sperling	11:307–53
Fc Receptors and Their Interactions with Immunoglobulins	M. Raghavan, P. J. Bjorkman	12:181–220

CHLOROPLAST

Import and Routing of Nucleus-Encoded Chloroplast Proteins	K. Cline, R. Henry	12:1–26

CHROMATIN		
Genetics of Transcriptional Regulation in Yeast: Connections to the RNA Polymerase II CTD	M. Carlson	13:1–23
CHROMOSOMES AND CENTROMERES		
Structure and Function of Kinetochores in Budding Yeast	A. A. Hyman, P. K. Sorger	11:471–95
Mitotic Chromosome Condensation	D. Koshland, A. Strunnikov	12:305–33
CILIA AND FLAGELLA		
Dyneins: Molecular Structure and Cellular Function	R. Vallee, E. L. F. Holzbaur	10:339–72
CONTRACTILE PROTEINS AND ASSEMBLIES		
Life at the Leading Edge: The Formation of Cell Protrusions	J. Condeelis	9:411–44
Small GTP-Binding Proteins and the Regulation of the Actin Cytoskeleton	A. Hall	10:31–54
Structure of Actin-Binding Proteins: Insights about Function at Atomic Resolution	T. D. Pollard, S. Almo, S. Quirk, V. Vinson, E. E. Lattman	10:207–49
Dyneins: Molecular Structure and Cellular Function	R. Vallee, E. L. F. Holzbaur	10:339–72
The Cell Biology of Infection by Intracellular Bacterial Pathogens	J. A. Theriot	11:213–39
The Molecular Architecture of Focal Adhesions	B. M. Jockusch, P. Bubeck, K. Giehl, M. Kroemker, J. Moschner, M. Rothkegel, M. Rüdiger, K. Schlüter, G. Stanke, J. Winkler	11:379–416
Structure and Function of Kinetochores in Budding Yeast	A. A. Hyman, P. K. Sorger	11:471–95
Control of Actin Assembly at Filament Ends	D. A. Schafer, J. A. Cooper	11:497–518
Actin: General Principles from Studies in Yeast	D. G. Drubin, K. R. Ayscough	12:129–60
The Mammalian Myosin Heavy Chain Gene Family	A. Weiss, L. A. Leinwand	12:417–39
Focal Adhesions, Contractility, and Signaling	K. Burridge, M. Chrzanowska-Wodnicka	12:463–518
Structure-Function Analysis of the Motor Domain of Myosin	K. M. Ruppel, J. A. Spudich	12:543–73
Microtubule Polymerization Dynamics	A. Desai, T. J. Mitchison	13:83–117
The Design Plan of Kinesin Motors	R. D. Vale, R. J. Fletterick	13:745–77
CYTOKINES		
Tumor Necrosis Factor, Other Cytokines and Disease	K. J. Tracey, A. Cerami	9:317–43
Cytokine Receptor Signal Transduction and the Control of Hematopoietic Cell Development	S. S. Watowich, H. Wu, M. Socolovsky, U. Klingmuller, S. N. Constantinescu, H. F. Lodish	12:91–128
CYTOSKELETON		
The Spectrin-based Membrane Structure and Micron-Scale Organization of the Plasma Membrane	V. Bennett, D. M. Gilligan	9:27–66
Functional Elements of the Cytoskeleton in the Early *Drosophila* Embryo	E. D. Schejter, E. Wieschaus	9:67–99
Life at the Leading Edge: The Formation of Cell Protrusions	J. Condeelis	9:411–44
Small GTP-Binding Proteins and the Regulation of the Actin Cytoskeleton	A. Hall	10:31–54
Microtubules in Plant Morphogenesis: Role of the Cortical Array	R. Cyr	10:153–80

Structure of Actin-Binding Proteins: Insights about Function at Atomic Resolution	T. D. Pollard, S. Almo, S. Quirk, V. Vinson, E. E. Lattman	10:207–49
Dyneins: Molecular Structure and Cellular Function	R. Vallee, E. L. F. Holzbaur	10:339–72
Keratins and the Skin	E. Fuchs	11:123–53
Drosophila Gastrulation: From Pattern Formation to Morphogenesis	M. Leptin	11:189–212
The Cell Biology of Infection by Intracellular Bacterial Pathogens	J. A. Theriot	11:213–39
The Molecular Architecture of Focal Adhesions	B. M. Jockusch, P. Bubeck, K. Giehl, M. Kroemker, J. Moschner, M. Rothkegel, M. Rüdiger, K. Schlüter, G. Stanke, J. Winkler	11:379–416
Control of Actin Assembly at Filament Ends	D. A. Schafer, J. A. Cooper	11:497–518
Unconventional Myosins	M. S. Mooseker, R. E. Cheney	11:633–75
Actin: General Principles from Studies in Yeast	D. G. Drubin, K. R. Ayscough	12:129–60
The Mammalian Myosin Heavy Chain Gene Family	A. Weiss, L. A. Leinwand	12:417–39
Focal Adhesions, Contractility, and Signaling	K. Burridge, M. Chrzanowska-Wodnicka	12:463–518
Microtubule Polymerization Dynamics	A. Desai, T. J. Mitchison	13:83–117
Genetic Analysis of the Actin Cytoskeleton in the *Drosophila* Ovary	D. N. Robinson, L. Cooley	13:147–70
Plant Cell Morphogenesis: Plasma Membrane Interactions with the Cytoskeleton and Cell Wall	J. E. Fowler, R. S. Quatrano	13:697–743

DEVELOPMENTAL BIOLOGY

Functional Elements of the Cytoskeleton in the Early *Drosophila* Embryo	E. D. Schejter, E. Wieschaus	9:67–99
Molecular Aspects of Epithelial-Mesenchymal Interactions	W. Birchmeier, C. Birchmeier	9:511–40
Vasculogenesis	W. Risau, I. Flamme	11:73–91
Drosophila Gastrulation: From Pattern Formation to Morphogenesis	M. Leptin	11:189–212
Cytokine Receptor Signal Transduction and the Control of Hematopoietic Cell Development	S. S. Watowich, H. Wu, M. Socolovsky, U. Klingmuller, S. N. Constantinescu, H. F. Lodish	12:91–128
Left-Right Asymmetry in Animal Development	W. B. Wood	13:53–82
Genetic Analysis of the Actin Cytoskeleton in the *Drosophila* Ovary	D. N. Robinson, L. Cooley	13:147–70
Formation and Function of Spemann's Organizer	R. Harland, J. Gerhart	13:611–67
Plant Cell Morphogenesis: Plasma Membrane Interactions with the Cytoskeleton and Cell Wall	J. E. Fowler, R. S. Quatrano	13:697–743

ENDOCYTOSIS

Signal-Dependent Membrane Protein Trafficking in the Endocytic Pathway	I. S. Trowbridge, J. F. Collawn, C. R. Hopkins	9:129–61
Biology of Animal Lectins	K. Drickamer, M. E. Taylor	9:237–64
Vertebrate Limb Development	C. Tickle, G. Eichele	10:121–52
Receptor-Mediated Protein Sorting to the Vacuole in Yeast: Roles	J. H. Stack, B. Horazdovsky, S. D. Emr	11:1–33
How MHC Class II Molecules Acquire Peptide Cargo: Biosynthesis and Trafficking Through the Endocytic Pathway	P. R. Wolf, H. L. Ploegh	11:267–306
Organizing Spatial Pattern in Limb Development	W. J. Brook, F. J. Diaz-Benjumea, S. M. Cohen	12:161–80

Acquisition of Identity in the Developing Leaf	A. W. Sylvester, L. Smith, M. Freeling	12:257–304
Germ Cell Development in *Drosophila*	A. Williamson, R. Lehmann	12:365–91
A Conserved Signaling Pathway: The *Drosophila* Toll-Dorsal Pathway	M. P. Belvin, K. V. Anderson	12:393–416
Endocytosis and Molecular Sorting	I. Mellman	12:575–625
EXOCYTOSIS		
The Role of GTP-Binding Proteins in Transport Along the Exocytic Pathway	S. Ferro-Novick, P. Novick	9:575–99
GENES AND GENE TRANSCRIPTION		
Transcriptional Repression in Eukaryotes	B. M. Herschbach, A. D. Johnson	9:479–509
The Retinoblastoma Gene: More than a Tumor Suppressor	D. J. Riley, E. Y. P. Lee, W. Lee	10:1–29
Structure, Regulation, and Function of NF-κB	U. Siebenlist, G. Franzoso, K. Brown	10:405–55
Transcription Factors Responsive to cAMP	P. Sassone-Corsi	11:355–77
Heat Shock Transcription Factors: Structure and Regulation	C. Wu	11:441–69
Silencing and Heritable Domains of Gene Expression	S. Loo, J. Rine	11:519–48
Genetics of Transcriptional Regulation in Yeast: Connections to the RNA Polymerase II CTD	M. Carlson	13:1–23
GTP-BINDING PROTEINS		
The Role of GTP-Binding Proteins in Transport Along the Exocytic Pathway	S. Ferro-Novick, P. Novick	9:575–99
Small GTP-Binding Proteins and the Regulation of the Actin Cytoskeleton	A. Hall	10:31–54
Role of Protein Lipidation Reactions in Programming Interactions	J. A. Glomset, C. C. Farnsworth	10:181–205
Receptor-Mediated Protein Sorting to the Vacuole in Yeast: Roles	J. H. Stack, B. Horazdovsky, S. D. Emr	11:1–33
HEAT SHOCK PROTEINS/CHAPERONES		
Role of the Major Heat Shock Proteins as Molecular Chaperones	C. Georgopoulos, W. J. Welch	9:601–34
Heat Shock Transcription Factors: Structure and Regulation	C. Wu	11:441–69
INTERCELLULAR COMMUNICATION		
Nitric Oxide: A Neural Messenger	S. R. Jaffrey, S. H. Snyder	11:417–40
Cross-Talk Between Bacterial Pathogens and Their Host Cells	J. E. Galán, J. B. Bliska	12:221–55
INTRACELLULAR MEMBRANE SYSTEMS		
Signal Sequence Recognition and Protein Targeting to the Endoplasmic Reticulum Membrane	P. Walter, A. E. Johnson	10:87–119
Role of Protein Lipidation Reactions in Programming Interactions	J. A. Glomset, C. C. Farnsworth	10:181–205
Receptor-Mediated Protein Sorting to the Vacuole in Yeast: Roles	J. H. Stack, B. Horazdovsky, S. D. Emr	11:1–33
COPs Regulating Membrane Traffic	T. E. Kreis, M. Lowe, R. Pepperkok	11:677–706
Signal-Mediated Sorting of Membrane Proteins Between the Endoplasmic Reticulum and the Golgi Apparatus	R. D. Teasdale, M. R. Jackson	12:27–54
Transport Vesicle Docking: SNAREs and Associates	S. R. Pfeffer	12:441–61

Nuclear Fusion in the Yeast *Saccharomyces cerevisiae*	M. D. Rose	12:663–95
Mitochondrial Preprotein Translocase	N. Pfanner, E. A. Craig, A. Hölinger	13:25–51
Structure, Function, and Regulation of the Vacuolar (H+)-ATPase	T. Stevens, M. Forgac	13:779–808
MEMBRANE INFRASTRUCTURES		
The Spectrin-based Membrane Structure and Micron-Scale Organization of the Plasma Membrane	V. Bennett, D. M. Gilligan	9:27–66
Small GTP-Binding Proteins and the Regulation of the Actin Cytoskeleton	A. Hall	10:31–54
Keratins and the Skin	E. Fuchs	11:123–53
Biological Atomic Force Microscopy: From Microns to Nanometers and Beyond	Z. Shao, J. Yang, A. P. Somlyo	11:241–65
Integrins: Emerging Paradigms of Signal Transduction	M. H. Ginsberg, M. A. Schwartz, M. D. Schaller	11:549–99
Transport Vesicle Docking: SNAREs and Associates	S. R. Pfeffer	12:441–61
Focal Adhesions, Contractility, and Signaling	K. Burridge, M. Chrzanowska-Wodnicka	12:463–518
RGD and Other Recognition Sequences for Integrins	E. Ruoslahti	12:697–715
Mitochondrial Preprotein Translocase	N. Pfanner, E. A. Craig, A. Hönlinger	13:25–51
MEMBRANE PROTEINS		
Signal Sequence Recognition and Protein Targeting to the Endoplasmic Reticulum Membrane	P. Walter, A. E. Johnson	10:87–119
Biological Atomic Force Microscopy: From Microns to Nanometers and Beyond	Z. Shao, J. Yang, A. P. Somlyo	11:241–65
The Molecular Architecture of Focal Adhesions	B. M. Jockusch, P. Bubeck, K. Giehl, M. Kroemker, J. Moschner, M. Rothkegel, M. Rüdiger, K. Schlüter, G. Stanke, J. Winkler'	11:379–416
Carbohydrate-Protein Interactions in Vascular Biology	R. M. Nelson, A. Venot, M. P. Bevilacqua, R. J. Linhardt, I. Stamenkovic	11:601–31
COPs Regulating Membrane Traffic	T. E. Kreis, M. Lowe, R. Pepperkok	11:677–706
Signal-Mediated Sorting of Membrane Proteins Between the Endoplasmic Reticulum and the Golgi Apparatus	R. D. Teasdale, M. R. Jackson	12:27–54
Fc Receptors and Their Interactions with Immunoglobulins	M. Raghavan, P. J. Bjorkman	12:181–220
Transport Vesicle Docking: SNAREs and Associates	S. R. Pfeffer	12:441–61
Focal Adhesions, Contractility, and Signaling	K. Burridge, M. Chrzanowska-Wodnicka	12:463–518
Endocytosis and Molecular Sorting	I. Mellman	12:575–625
Mitochondrial Preprotein Translocase	N. Pfanner, E. A. Craig, A. Hönlinger	13:25–51
Structure, Function, and Regulation of the Vacuolar (H+)-ATPase	T. Stevens, M. Forgac	13:779–808
MITOCHONDRIA		
Mitochondrial Preprotein Translocase	N. Pfanner, E. A. Craig, A. Hönlinger	13:25–51

MOLECULAR MOTORS
Structure of Actin-Binding Proteins: Insights about Function at Atomic Resolution — T. D. Pollard, S. Almo, S. Quirk, V. Vinson, E. E. Lattman — 10:207–49
Dyneins: Molecular Structure and Cellular Function — R. Vallee, E. L. F. Holzbaur — 10:339–72
Unconventional Myosins — M. S. Mooseker, R. E. Cheney — 11:633–75
The Mammalian Myosin Heavy Chain Gene Family — A. Weiss, L. A. Leinwand — 12:417–39
Structure-Function Analysis of the Motor Domain of Myosin — K. M. Ruppel, J. A. Spudich — 12:543–73
The Design Plan of Kinesin Motors — R. D. Vale, R. J. Fletterick — 13:745–77

NUCLEAR ENVELOPE AND NUCLEAR PORE COMPLEXES
Protein Import into the Nucleus: An Integrated View — G. R. Hicks, N. V. Raikhel — 11:155–88
Nuclear Fusion in the Yeast *Saccharomyces cerevisiae* — M. D. Rose — 12:663–95
Nuclear Assembly — T. M. Gant, K. L. Wilson — 13:669–95

NUCLEUS, SPECIALIZED DOMAINS
Macromolecular Domains Within the Cell Nucleus — D. L. Spector — 9:265–315
The Nucleolus — P. J. Shaw, E. G. Jordan — 11:93–121

PEROXISOMES
Protein Import into Peroxisomes and Biogenesis of the Organelle — S. Subramani — 9:445–78
Peroxisome Proliferator-Activated Receptors: A Nuclear Receptor Signaling Pathway in Lipid Physiology — T. Lemberger, B. Desvergne, W. Wahli — 12:335–63

PLANT CELL BIOLOGY
Signal Transduction in Guard Cells — S. M. Assmann — 9:345–75
Import and Routing of Nucleus-Encoded Chloroplast Proteins — K. Cline, R. Henry — 12:1–26
Acquisition of Identity in the Developing Leaf — A. W. Sylvester, L. Smith, M. Freeling — 12:257–304
Assembly and Enlargement of the Primary Cell Wall in Plants — D. J. Cosgrove — 13:171–201
Light Control of Plant Development — C. Fankhauser, J. Chory — 13:203–29
Plant Cell Morphogenesis: Plasma Membrane Interactions with the Cytoskeleton and Cell Wall — J. E. Fowler, J. S. Quatrano — 13:697–743

PLASMALEMMA
The Spectrin-based Membrane Structure and Micron-Scale Organization of the Plasma Membrane — V. Bennett, D. M. Gilligan — 9:27–66
RGD and Other Recognition Sequences for Integrins — E. Ruoslahti — 12:697–715

PROKARYOTIC-EUKAROYTIC INTERACTIONS
The Cell Biology of Infection by Intracellular Bacterial Pathogens — J. A. Theriot — 11:213–39
Cross-Talk Between Bacterial Pathogens and Their Host Cells — J. E. Galán, J. B. Bliska — 12:221–55

PROTEIN AND MEMBRANE TRAFFIC CONTROL
Signal-Dependent Membrane Protein Trafficking in the Endocytic Pathway — I. S. Trowbridge, J. F. Collawn, C. R. Hopkins — 9:129–61

Assembly and Intracellular Transport of MHC Class I Molecules	M. R. Jackson, P. A. Peterson	9:207–35
Protein Import into Peroxisomes and Biogenesis of the Organelle	S. Subramani	9:445–78
The Role of GTP-Binding Proteins in Transport Along the Exocytic Pathway	S. Ferro-Novick, P. Novick	9:575–99
Role of the Major Heat Shock Proteins as Molecular Chaperones	C. Georgopoulos, W. J. Welch	9:601–34
Signal Sequence Recognition and Protein Targeting to the Endoplasmic Reticulum Membrane	P. Walter, A. E. Johnson	10:87–119
Receptor-Mediated Protein Sorting to the Vacuole in Yeast: Roles	J. H. Stack, B. Horazdovsky, S. D. Emr	11:1–33
Protein Import into the Nucleus: An Integrated View	G. R. Hicks, N. V. Raikhel	11:155–88
COPs Regulating Membrane Traffic	T. E. Kreis, M. Lowe, R. Pepperkok	11:677–706
Signal-Mediated Sorting of Membrane Proteins Between the Endoplasmic Reticulum and the Golgi Apparatus	R. D. Teasdale, M. R. Jackson	12:27–54
Transport Vesicle Docking: SNAREs and Associates	S. R. Pfeffer	12:441–61
Endocytosis and Molecular Sorting	I. Mellman	12:575–625
PROTEIN KINASES, PROTEIN PHOSPHATASES		
Protein Serine/Threonine Phosphatases: New Avenues for Cell Regulation	S. Shenolikar	10:55–86
Receptor Protein-Tyrosine Kinases and their Signal Transduction Pathways	P. van der Geer, T. Hunter, R. A. Lindberg	10:251–337
Receptor-Mediated Protein Sorting to the Vacuole in Yeast: Roles	J. H. Stack, B. Horazdovsky, S. D. Emr	11:1–33
Cellular Functions Regulated by SRC Family Kinases	S. M. Thomas, J. S. Brugge	13:513–609
PROTO-ONCOGENES, ONCOGENES		
Structure, Regulation, and Function of NF-κB	U. Siebenlist, G. Franzoso, K. Brown	10:405–55
RECEPTORS AND SIGNAL TRANSDUCTION FACTORS		
Signal-Dependent Membrane Protein Trafficking in the Endocytic Pathway	I. S. Trowbridge, J. F. Collawn, C. R. Hopkins	9:129–61
Biology of Animal Lectins	K. Drickamer, M. E. Taylor	9:237–64
Protein Serine/Threonine Phosphatases: New Avenues for Cell Regulation	S. Shenolikar	10:55–86
Receptor Protein-Tyrosine Kinases and their Signal Transduction Pathways	P. van der Geer, T. Hunter, R. A. Lindberg	10:251–337
AH Receptor Signaling Pathways	J. V. Schmidt, C. A. Bradfield	12:55–89
Cytokine Receptor Signal Transduction and the Control of Hematopoietic Cell Development	S. S. Watowich, H. Wu, M. Socolovsky, U. Klingmuller, S. N. Constantinescu, H. F. Lodish	12:91–128
Peroxisome Proliferator-Activated Receptors: A Nuclear Receptor Signaling Pathway in Lipid Physiology	T. Lemberger, B. Desvergne, W. Wahli	12:335–63
A Conserved Signaling Pathway: The *Drosophila* Toll-Dorsal Pathway	M. P. Belvin, K. V. Anderson	12:393–416
Focal Adhesions, Contractility, and Signaling	K. Burridge, M. Chrzanowska-Wodnicka	12:463–518

Signaling by Extracellular Nucleotides	A. J. Brake, D. Julius	12:519–41
The LIN-12/Notch Signaling Pathway and Its Regulation	J. Kimble, P. Simpson	13:333–61
The Two-Component Signaling Pathway of Bacterial Chemotaxis: A Molecular View of Signal Transduction by Receptors, Kinases, and Adaptation Enzymes	J. J. Falke, R. B. Bass, S. L. Butler, S. A. Chervitz, M. A. Danielson	13:457–512
SIGNAL TRANSDUCTION		
Signal Transduction in Guard Cells	S. M. Assmann	9:345–75
Small GTP-Binding Proteins and the Regulation of the Actin Cytoskeleton	A. Hall	10:31–54
Protein Serine/Threonine Phosphatases: New Avenues for Cell Regulation	S. Shenolikar	10:55–86
Role of Protein Lipidation Reactions in Programming Interactions	J. A. Glomset, C. C. Farnsworth	10:181–205
Receptor Protein-Tyrosine Kinases and their Signal Transduction Pathways	P. van der Geer, T. Hunter, R. A. Lindberg	10:251–337
Nitric Oxide: A Neural Messenger	S. R. Jaffrey, S. H. Snyder	11:417–40
Integrins: Emerging Paradigms of Signal Transduction	M. H. Ginsberg, M. A. Schwartz, M. D. Schaller	11:549–99
The LIN-12/Notch Signaling Pathway and Its Regulation	J. Kimble, P. Simpson	13:333–61
The Two-Component Signaling Pathway of Bacterial Chemotaxis: A Molecular View of Signal Transduction by Receptors, Kinases, and Adaptation Enzymes	J. J. Falke, R. B. Bass, S. L. Butler, S. A. Chervitz, M. A. Danielson	13:457–512